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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,142	08/18/2006	Masaru Shirai	P30470	1550
7055 7590 03/14/2011 GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191				
EXAMINER D'ANIELLO, NICHOLAS P				
ART UNIT		PAPER NUMBER		
1735				
NOTIFICATION DATE		DELIVERY MODE		
03/14/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/598,142

Applicant(s)

SHIRAI ET AL.

Examiner

Nicholas P. D'Aniello

Art Unit

1735

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23-38 is/are pending in the application.
4a) Of the above claim(s) 1-20 and 28-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21, 23-27, 36 and 37 is/are rejected.
- 7) ☒ Claim(s) 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Relevant MPEP Sections

MPEP 2114 relating to Apparatus and Article claims – Functional Language:
While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. >*In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997)

MPEP 2115: "Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 21 and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuno et al. (USP 5,338,008).

In regard to **independent claim 21**, Okuno et al. teach a solder bump forming apparatus, see figure 1 (*for forming a solder bump through heating and reflowing a solder composition on a substrate where a plurality of pad electrodes are provided*, is intended use MPEP 2111.02 and does not limit the structure of the apparatus however Okuno et al. forms solder bumps on a printed board PB with pad electrodes by reflowing), wherein: (*the solder composition is made of a mixture of solder particles and a liquid material that contains a flux component, which becomes liquid at a normal temperature or when heated*, relates to the material worked upon by the apparatus MPEP 2115 and does not limit the structure of the apparatus, however Okuno et al. uses a solder paste i.e. solder particles and flux see column 1 lines 26-45); and a heating device (upper or lower heater 3 or **upper and lower fans 20**) is provided for heating the solder composite from a first or second side; and a thermostat device (many elements, such as heating element 7, cooling device 10, rectifying plate 11, fan 16, **jacket 17**) for controlling a temperature of the solder composition is provided at a position above a mount plate (conveyor 2) (column 3 line 66 - column 4 line 50).

Okuno et al. embrace "wherein the thermostat device includes a system in which the cool air or hot air of the thermostat device does not directly come in contact with the solder composition on the substrate" because (A) Okuno et al. teaches a system (upper portion of figure 2 above jacket 17) which circulates outside air with fan 20 and constitutes a heat exchange means (and therefore the air is taken to be either hot or cool) for the thermostat device (cooling device 10) but does not allow the outside air to come into contact with the solder composition because **jacket 17** completely separates

the outside air from the solder composition (see figure 2 - column 4 lines 55-64) and (B) the limitation relates to a functional limitation and as the apparatus of Okuno et al. has all the claimed structure it is reasonably taken to be capable of performing the claimed function.

Okuno et al. teaches the apparatus includes a space through which the substrate is conveyed (along and directly above conveyor 2 - see figures 1 and 2) and that the outside air from fan 20 does not come into contact with the substrate and solder on the substrate within that space (column 4 lines 55-64).

In regard to the limitation ("wherein the heating device blows hot air, and wherein the blowing of hot air of the heating device does not directly come in contact with the solder composition on the substrate within a space through with the substrate is conveyed") is a functional limitation which does not positively require any additional structure in the apparatus. Such is embraced by the reference in at least the following two interpretations -

(A) the fans 20 on either side of substrate (such as the upper fan 20) may fairly be considered a heating device because such is capable of blowing hot air, and the hot air would not come into contact with the solder composition because the chamber is isolated by jacket 17 and

(B) the fan 16 on the lower side of the substrate may be considered the heating device (taking this interpretation the first and second side of the substrate would be reversed) because it circulates hot air from the heater above the substrate (see figure 2) and as the solder composition is provided on the top side of the substrate, the hot air

blown by fan 16 does not come into direct contact with the solder composition as it is deflected by the bottom of the substrate.

In regard to **claim 23**, the thermostat device comprises a radiation plate (jacket 17, gas blowing port 12 in plate) for heating the solder composition by radiant heat and a heating section (preheating section S or heating section H) for heating the radiation plate (figure 2).

In regard to **claim 24** the thermostat device comprises a heat absorbing plate (jacket 17, rectifying plate 11) for depriving heat of the solder composition and an endothermic section (cooling section C) for cooling the heat absorbing plate (figures).

In regard to **claim 25**, the heating device 3, 20 applies heat by blowing hot air (with fan 16) to a bottom side of the substrate (figures).

In regard to **claim 26**, the heating device 3, 20 heats a bottom side of the substrate by thermal conduction (forced air is thermal conduction).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okuno as applied to claim 21 above, and further in view of Campbell (USP 4,334,646).

Okuno teaches the solder bump forming apparatus as applied above where the heating device 3 heats the solder composition from the first side of the substrate. **Claim 27** differs from the reference in calling for the substrate to be immersed in the solder composition within a container which is heated. However, Campbell et al. teach a similar solder bump forming apparatus (figure 1) and the desirability to heat the substrate 44, 50 as it is immersed in the solder composition within a container 30; and the heating device heats the solder composition from the substrate side through the container to prevent oxidation from occurring and increase the continuity of the connections (column 3 lines 46-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the substrate in a container immersed in the solder composition in the apparatus of Okuno as such prevents oxidation creating better connections as taught by Campbell.

5. Claims 36 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuno et al. (USP 5,338,008).

NOTE: The rejection of these new dependent claims requires a different interpretation of the independent claim. The functional and material worked upon limitations of the independent claim are not limiting as applied above and have been omitted.

Okuno et al. teach a solder bump forming apparatus, see figure 2, comprising: a heating device (bottom of apparatus including but not limited to fan 20 and jacket 17) is

provided for heating the solder composite from a first or second side; and a thermostat device (top of apparatus, including but not limited to jacket 17 and fan 20) for controlling a temperature of the solder composition is provided at a position above a mount plate (conveyor 2) (column 3 line 66 - column 4 line 50).

In regard to claim 36, the thermostat device being enclosed within a thermostat enclosure (upper wall 19); the heating device being enclosed within a heating device enclosure (lower wall 19); and the thermostat enclosure and heating device enclosure preventing all blowing air of the solder bump forming apparatus from being blown within the space through which the substrate is conveyed (figure 2; column 4 lines 55-64).

In regard to claim 37, the thermostat enclosure includes a thermostat circulation duct (upper air outlet port 21) that defines at least part of a thermostat circulation path within the thermostat enclosure, and wherein the heating device enclosure includes a heating device circulation duct (lower air outlet 21) that defines at least part of a heating circulation path within the heating device enclosure (figure 2; column 4 lines 55-64).

Allowable Subject Matter

Claim 38 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The closest prior art, Okuno et al. teach a solder bump forming apparatus as applied to claim 37 above where a blower 20 and a thermostat circulation duct 21

defines a circulation path for the thermostat medium and the heating circulation duct 21 defines a circulation path for the heating medium and each have enclosures (walls 19 and jacket 17) which prevent air from being blown in the space which the substrate is conveyed; however the prior art as a whole fails to disclose or render obvious a structure that would be capable of the claimed thermostat and heating circulation paths, wherein the thermostat circulation path provides a thermostat flow path from the main thermostat source, through the cool/heat storage member, along the heat absorbing plate, through the thermostat circulation duct having the sub-thermostat source therein, to the thermostat blower, and returning to the main thermostat source, and, wherein the heating circulation path provides a heating flow path from the main heating source, through the heat storage member, along the covered opening, through the heating device circulation duct having the sub-heating source therein, to the heat blower, and returning to the main heating source.

Response to Arguments

Applicant's arguments in regard to the art rejections have been fully considered but they are not persuasive. Specifically, applicant argues that the heating element 7 equated to the claimed thermostat device does not meet the claimed limitations. However many elements were equated to thermostat device including jacket 17 which controls the temperature by indirectly transferring heat from the outside air blown by fans 20 (see figure 2). In any event, applicant is attempting to distinguish the apparatus

in terms of function (see MPEP sections above) and as apparatus claims must be different in terms of structure, the claims are open to extremely broad interpretations because the prior art only has to be capable of performing the claimed functions, which the structurally indistinguishable apparatus of the prior art is fairly assumed to be capable of. This could be done simply by providing a solder composition that is completely covered by electrical components on the substrate.

In other words, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Although it is appreciated that one of the heating devices of Okuno et al. is intended to blow hot air directly onto the solder composition, the device is Okuno et al. is outfitted with several other heating devices which do not blow air directly on the top side of the substrate.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a cooling thermostat) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P. D./

Examiner, Art Unit 1735

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 1735